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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|-------------|----------------------|---------------------|------------------|
| 09/932,236 | 08/16/2001 | Haining Yang | MI22-1725 | 4828 |
| 21567 | 7590 | 07/12/2006 | EXAMINER | |
| WELLS ST. JOHN P.S. 601 W. FIRST AVENUE, SUITE 1300 SPOKANE, WA 99201 | | | MITCHELL, JAMES M | |
| | | | ART UNIT | PAPER NUMBER |
| | | | 2813 | |
| DATE MAILED: 07/12/2006 | | | | |

Please find below and/or attached an Office communication concerning this application or proceeding.

H.A

| | | | |
|------------------------------|------------------------|---------------------|--|
| Office Action Summary | Application No. | Applicant(s) | |
| | 09/932,236 | YANG, HAINING | |
| | Examiner | Art Unit | |
| | James M. Mitchell | 2813 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 21 February 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 55, 59 and 70 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 55 and 70 is/are rejected.
- 7) ☒ Claim(s) 59 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date <u>2/27/06, 3/10/06</u> | 6) <input checked="" type="checkbox"/> Other: <u>IDS cont 5/16/06</u> |

DETAILED ACTION

1. This office action is in response to applicant's arguments filed February 21, 2006.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 55 and 70 are rejected under 35 U.S.C. 102(e) as being anticipated by Buchanan (U.S. 6,984,591).

4. Buchanan (Fig. 3A,B) discloses:

(cl. 55) a method of forming a conductive material, comprising: providing a semiconductor substrate (45); forming an insulative material (43) over the substrate, wherein the insulative material comprises sidewalls defining an opening (41) extending to the substrate in at least one cross-section; forming a first conductive material (46) over the substrate and within the opening, the first conductive material comprising one or more of TiN, WN, TaN, elemental Ta, and elemental Ti (Col. 28, Lines 60-64); depositing a second conductive material (47) physically against the first conductive material, the second conductive material consisting essentially of a metal and being different than the first conductive material (e.g. "Al", Col. 28, Lines 64-66), wherein the depositing comprises: providing a metallo-organic precursor proximate the first

conductive material, wherein the metallo-organic precursor comprises the metal and carbon (CLM 1 of Buchanan); and exposing the precursor to a reducing atmosphere (Col. 20, Lines 13-16) to release the metal from the precursor to form the second conductive material physically against the first conductive material without an insulative composition between the first and second conductive materials (Fig. 3B), and etching the conductive material into a rectangular block (Col. 28, Lines 52-54) wherein the sidewalls of the block are aligned vertically between the sidewalls defining the opening in at least the one cross-section (Fig. 3B);
(cl. 70) and the block (e.g. shape of conductive material) is aligned horizontally above the insulative material in at least one cross section.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 55 and 70 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nabatame (U.S. 2004/0214392) in combination with Joo et al. (U.S. 2002/0056839).

7. Nabatame (Fig. 7) discloses:

(cl. 55) a method of forming a conductive material, comprising: providing a semiconductor substrate (71); forming an insulative material (74) over the substrate,

wherein the insulative material comprises sidewalls defining an opening extending to the substrate in at least one cross-section; forming a first conductive material (73) over the substrate and within the opening, the first conductive material comprising one or more of TiN, WN, TaN, elemental Ta, and elemental Ti; depositing a second conductive material (75) physically against the first conductive material, the second conductive material consisting essentially of a metal and being different than the first conductive material ("Ru"; Par. 0046), wherein the depositing comprises: providing a metallo-organic precursor proximate the first conductive material, wherein the metallo-organic precursor comprises the metal and carbon (Par. 0022; 0043); and exposing the precursor to a reducing atmosphere ("dissolved"; Par. 0022) to release the metal from the precursor to form the second conductive material physically against the first conductive material without an insulative composition between the first and second conductive materials;

(cl. 70) and the block (i.e. shape of conductive material, 75) is aligned horizontally above the insulative material in at least one cross section.

8. Nabatame further discloses its second conductive material a rectangular block (Fig. 7), but does not appear to show etching into the shape wherein the sidewalls of the block are aligned vertically between the sidewalls defining the opening in at least the one cross-section.

9. Joo teaches the use of etching (Par. 0029)

10. It would have been obvious to one of ordinary skill in the art to incorporate an etching step to the electrode of Nabatame in order to in order to shape the material as taught by Joo (Par. 0029).

11. In regards to claim 55 that the sidewalls of the block aligned vertically with sidewall of the opening, applicant has not disclosed that the electrode shape and size are for a particular unobvious purpose, produce an unexpected result, or are otherwise critical. As such, it would have been obvious to one of ordinary skill in the art to form the electrode with the claimed shape and size, since it has been held that mere dimensional limitations are prima facie obvious absent a disclosure that the limitations are for a particular unobvious purpose, produce an unexpected result, or are otherwise critical. See, for example, *In re Rose*, 220 F.2d 459, 105 USPQ 237 (CCPA 1955); *In re Rinehart*, 531 F.2d 1048, 189 USPQ 143 (CCPA 1976); *Gardner v. TEC Systems, Inc.*, 725 F.2d 1338, 220 USPQ 777 (Fed. Cir. 1984), cert. denied, 469 U.S. 830, 225 USPQ 232 (1984); *In re Dailey*, 357 F.2d 669, 149 USPQ 47 (CCPA 1966).

Allowable Subject Matter

12. Claim 59 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

13. The following is a statement of reasons for the indication of allowable subject matter: the prior art not assigned to applicant does not disclose or make obvious forming a reducing atmosphere of ammonia forming a second metal on a first metal

without an insulation between the two including all the limitations of the independent claim.

Response to Arguments

14. With respect to claims 55 and 70, applicant's arguments filed February 21, 2006 have been fully considered but they are not persuasive. Applicant contends that the Nabatme does not show or suggest a reducing atmosphere without further clarification except to highlight examiner's statement that the material is dissolved. Nevertheless, Examiner disagrees. Nabatme teaches that that metallorganic passes/ dissolves into a solution/liquid, which is then converted to a gas due to the increase in temperature allowing the metal in the solution to be formed in another location [see also Par. 0022, 0050 of Nabatme]. Thereby, the change in temperature creates a reducing atmosphere (e.g. release metal from solution by being evaporated). For the reasons stated the rejection of claims 55 and 70 are deemed proper.

Conclusion

15. Applicant's submission of an information disclosure statement under 37 CFR 1.97(c) with the fee set forth in 37 CFR 1.17(p) on May 16, 2006 prompted the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 609.04(b). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within

TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to James M. Mitchell whose telephone number is (571) 272-1931. The examiner can normally be reached on M-F 8:00-4:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl Whitehead Jr. can be reached on (571) 272-1702. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

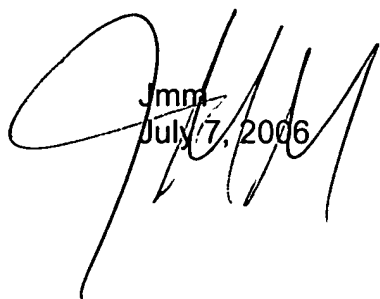
Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.


CARL WHITEHEAD, JR.
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800

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Jmm
July 7, 2006

A large, stylized handwritten signature in black ink, written over the typed name and date.